

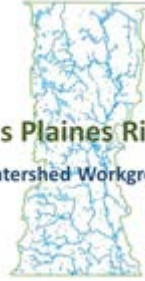
Appendix F: Biological & Water Quality Assessment of the Upper Des Plaines River & Tributaries

Full report can be found:

<http://www.drww.org/plans/reports>



Des Plaines River
Watershed Workgroup



Biological and Water Quality Assessment of the Upper Des Plaines River and Tributaries 2016



Des Plaines River at Wright Woods Dam (removed)



Indian Creek at Sullivan Woods Preserve

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EXECUTIVE SUMMARY

Summary of Findings

Aquatic Life Condition Assessment

The primary indicator of overall condition in terms of aquatic life is the status of the Illinois General Use using the Illinois fish and macroinvertebrate Indices of Biotic Integrity and generally following the guidance in the 2016 Integrated Report (IEPA 2016). The status of aquatic life is portrayed in an attainment table (Table 1) and expressed as full or non-support and based on the most limiting of either the fish or macroinvertebrate results. Non-support is further subdivided into non-support fair and non-support poor; a partial support category was added to clarify instances where only one of the two assemblages attained the General Use support threshold. Of the 70 sites assessed for General Use aquatic life use none were in full support, 22 non-support-fair, 26 non-support poor, and 21 partial support. One site was sampled for macroinvertebrates only and while it attained the mIBI threshold for full support, the attainment status was not determined. The fish assemblage was the limiting factor in many of the non-support and all of the partial support determinations failing to meet the IEPA General Use threshold for the fIBI at any sampling site in the 2016 study area which is similar to results observed in 2013 by IDNR (Pescitelli 2016). The Modified Index of Well-Being (MIwb; Ohio EPA 1987) was calculated for the fish assemblage at sites >20 mi.² and met an interim General Use support threshold at 10 of 24 sites. Macroinvertebrate assemblages attained the General Use threshold for the mIBI at 34 of the 70 biological sampling sites including all except the uppermost three mainstem sites.

Causes and Sources of Non-attainment¹

Causes and sources were determined for each impaired site and included categorical or parameter level associations and their sources (if known). These were compared to the IEPA derived causes listed in the 2016 Integrated Report (IEPA 2016) for coinciding sites. Assigning causes involves using a lines of evidence approach where chemical and physical indicators of a causal category or parameter is logically related to a biological impairment, not just simply based on the coincidental exceedance of a criterion or other threshold. Knowing about relationships that are supported by prior empirical observations in other studies or our own experiences helps boost the confidence in causal assignments. This process varies somewhat from that of IEPA in that additional effect thresholds were used to assign causes beyond those used by IEPA.

Eleven (11) different causal categories and four different source categories were identified for the 2016 study area (Table 1; Figure 1). Of these causes, four (4) were habitat related (siltation, no riparian, bank erosion, and channel modification) and seven (7) were chemical (low dissolved oxygen, organic enrichment, nutrients, chlorides, conductivity, manganese, and

¹ A **Cause** is an agent or agents associated with an aquatic life or recreational use impairment; a **Source** is the origin of the causal agent. Nomenclature generally follows U.S. EPA and state 303[d] listing guidelines.

Table 1. Aquatic life use attainment status in the 2016 Upper Des Plaines River watershed study area with associated causes and sources of impairment listed for partial and non-supporting sites determined by this study and by IEPA (2016) for matching sites (see footnote for fIBI and mIBI use support thresholds). fIBI, MIwb, and mIBI values that do not meet the threshold are asterisked (*) and poor values are underlined. The most limiting assemblage for partial support is indicated by a F (fish) or M (macroinvertebrates). Causes of impairment that exceed thresholds in the Illinois 2016 Integrated Report guidance are underlined.

DRWW Site ID	River Mile	Drain-age Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
Des Plaines River										
13-6	109.30	123.7	22*	<u>5.9*</u>	21.2*	51.0	Non - Fair	<u>Siltation; Dissolved Oxygen</u> ; Org. Enrich.; Nutrients; Chlorides	Urban runoff	D.O., TSS
13-5	106.60	137.3	24*	7.7*	29.5*	50.3	Non - Fair	<u>Siltation</u> ; Chlorides	Urban runoff	D.O., TSS
13-4	102.90	145.6	23*	7.8 ^{ns}	35.3*	48.5	Non - Fair	<u>Siltation</u> ; Chlorides	Urban runoff	D.O., Siltation, TSS
13-3	98.70	220.3	33*	9.7	57.9	81.0	Partial (F) ³	Org. Enrich; Siltation; Chlorides, PAHs	WWTP, Urban runoff	NA ⁴
13-2	96.82	225.4	31*	9.2	49.4	83.0	Partial (F)	Org. Enrich; Siltation; Chlorides	WWTP, Urban runoff	NA
13-1	94.20	232.0	32*	9.4	42.2	80.8	Partial (F)	Org. Enrich; Nutrient; Siltation; Chlorides	WWTP, Urban runoff	NA
13-16	90.60	253.8	28*	6.9*	44.8	74.8	Partial (F)	Org. Enrich; Nutrients; Siltation; Chlorides	WWTP, Urban runoff	Arsenic, Chlorides, TP

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
16-7	84.60	266.5	35*	9.3	51.6	78.3	Partial (F)	Org. Enrich; Nutrients; Siltation; Chlorides ⁵	WWTP, Urban runoff	NA
16-5	83.60	268.1	<u>19</u> *	7.1*	54.9	71.0	Non - Poor	Org. Enrich; Nutrients; Siltation; Chlorides, PAHs	WWTP, Urban runoff	NA
16-8	82.90	268.9	33*	9.1	49.8	79.8	Partial (F)	Org. Enrich; Nutrients; Siltation; Chlorides ⁵	WWTP, Urban runoff	NA
16-4	80.00	273.2	34*	8.6	58.8	73.5	Partial (F)	Org. Enrich; Nutrients; Siltation; Chlorides	WWTP, Urban runoff	NA
16-3	76.70	314.7	<u>19</u> *	<u>4.9</u> *	57.4	80.5	Non - Poor	Org. Enrich; Nutrients; Siltation; Chlorides	WWTP, Urban runoff	NA
16-2	75.40	324.0	36*	8.8	45.4	77.5	Partial (F)	Nutrients; Siltation; Chlorides	WWTP, Urban runoff	NA
16-1	71.70	358.7	38*	8.5	53.2	78.0	Partial (F)	Nutrients; Siltation; Chlorides; PAHs	WWTP, Urban runoff	NA
Seavey Drainage Ditch										
15-3	3.66	5.05	15	N/A	26.0	65.6	Non-Poor	Channelization; Siltation; Chlorides	Habitat Alteration; Urban Runoff	

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
15-8	0.45	9.77	24	N/A	25.7	54.0	Non-Fair	No riparian; Siltation; Channelization	Habitat Alteration; Urban Runoff	
Bull Creek										
14-6	5.95	1.32	12	N/A	22.1	54.5	Non-Poor	Dissolved Oxygen; Siltation	Habitat Alteration; Urban Runoff	
14-5	4.70	2.42	25	N/A	17.5	52.0	Non-Poor	Dissolved Oxygen; Siltation	Habitat Alteration; Urban Runoff	
14-2	1.00	8.44	28	N/A	35.3	57.5	Non-Fair	Siltation; Chlorides	Habitat Alteration; Urban Runoff	
14-1	0.50	11.69	36	N/A	62.9	89.5	Partial	Chlorides	Urban Runoff	
Aptakisic Creek										
18-4	4.70	1.09	27*	N/A	<u>18.5*</u>	52.5	Non - Poor	Dissolved Oxygen; Siltation	Urban Runoff; Altered Hydrology	NA
18-3	4.30	2.30	<u>17*</u>	N/A	25.6*	57.0	Non - Poor	No riparian; Channelization; PAHs	Habitat Alteration; Urban Runoff; Altered Hydrology	NA
18-2	0.80	4.94	26*	N/A	30.7*	46.0	Non - Fair	Siltation; Bank Erosion; Channelization; Chlorides	Habitat Alteration; Urban Runoff; Altered Hydrology	NA

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
18-1	0.50	5.50	24*	N/A	23.0*	52.0	Non - Fair	Channelized; Siltation; No riparian; Chlorides	WWTP; Habitat Alteration; Urban Runoff; Altered Hydrology	NA
Hastings Creek										
10-5	3.12	3.91	<u>13</u> *	N/A	31.6*	57.0	Non - Poor	Siltation; Chlorides	Urban Runoff; Altered Hydrology	NA
10-4	1.68	6.80	<u>11</u> *	N/A	<u>17.5</u>	38.5	Non - Poor	Channelized; Siltation; Chlorides	Habitat Alteration; Urban Runoff; Altered Hydrology	Arsenic, TP, siltation
Buffalo Creek										
17-5	14.00	1.37	25*	N/A	24.6*	66.0	Non - Fair	Siltation; Bank erosion;	Urban Runoff; Altered Hydrology	TSS
17-3	7.70	9.61	<u>12</u> *	N/A	48.1	69.0	Non - Poor	Siltation; Bank erosion; Chlorides	Urban Runoff; Altered Hydrology	TSS
17-2	6.10	22.1	21*	6.9*	50.5	60.5	Partial (F)	Siltation; Chlorides	Urban Runoff; Altered Hydrology	TSS

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
17-1	0.75	29.2	25*	6.2*	42.6	51.0	Partial (F)	Channelization ; Chlorides; PAHs	Habitat Alteration; Urban Runoff; Altered Hydrology	TSS
Bull's Brook										
13-15	1.95	1.92	<u>15</u> *	N/A	32.4*	63.3	Non - Poor	Siltation ; Bank erosion ;	Urban Runoff; Altered Hydrology	NA
13-7	0.25	2.69	26*	N/A	39.9*	64.0	Non - Fair	Siltation ; Conductivity; Manganese	Urban Runoff; Altered Hydrology	NA
Forest Lake Drain										
15-11	0.83	1.70	<u>16</u> *	N/A	28.5*	58.0	Non - Poor	Siltation	Urban Runoff; Altered Hydrology	NA
Indian Creek										
15-9	10.83	2.68	<u>18</u> *	N/A	<u>20.9</u> *	62.3	Non - Poor	Siltation ; Manganese	Urban Runoff; Altered Hydrology	D.O.
15-6	9.83	3.70	21*	N/A	23.7*	65.5	Non - Fair	Siltation ; Bank erosion ; Chlorides; Manganese	Urban Runoff; Altered Hydrology	D.O.

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
15-5	5.40	17.3	27*	N/A	37.7*	59.8	Non - Fair	Siltation ; Chlorides	Urban Runoff; Altered Hydrology	D.O.
15-2	2.41	35.0	35*	6.7*	58.5	79.0	Partial (F)	Siltation ; Chlorides	Urban Runoff; Altered Hydrology	D.O.
15-1	0.17	36.4	22*	<u>4.9*</u>	57.3	64.5	Partial (F)	Channelization ; Siltation; Chlorides; Manganese	Habitat Alteration; Urban Runoff; Altered Hydrology	D.O.
Killdeer Creek										
15-12	5.20	2.08	<u>20*</u>	N/A	37.0*	46.5	Non - Fair	Siltation	Urban Runoff; Altered Hydrology	NA
15-7	4.60	2.86	<u>17*</u>	N/A	32.4*	53.5	Non - Poor	Siltation ; Chlorides	Urban Runoff; Altered Hydrology	NA
15-13	2.21	5.01	<u>20*</u>	N/A	56.1	58.0	Partial (F)	Siltation ; Bank erosion ;	Urban Runoff	NA
15-4	0.17	6.80	23*	N/A	42.0	61.0	Partial (F)	Siltation ; Bank erosion ; No riparian ; Chlorides	Urban Runoff; Altered Hydrology	NA

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
Newport Drainage Ditch										
12-2	3.03	2.81	21*	N/A	33.7*	38.0	Non - Fair	Siltation ; Channelization	Habitat Alteration; Urban Runoff; Altered Hydrology	NA
12-1	0.70	7.35	29*	N/A	46.5	47.0	Partial (F)	Siltation ; Chlorides	Urban Runoff; Altered Hydrology	NA
Stoneroller Creek										
13-9	0.42	4.08	34*	N/A	57.9	72.8	Partial (F)	Siltation ; Chlorides	Urban Runoff; Altered Hydrology	NA
Suburban Country Club Tributary										
13-12	2.75	2.37	<u>15</u> *	N/A	31.6*	41.5	Non - Poor	Siltation ; Channelization	Habitat Alteration; Urban Runoff; Altered Hydrology	NA
13-10	2.00	4.02	22*	N/A	<u>19.2</u> *	47	Non - Poor	Siltation ; Channelization; Chlorides	Habitat Alteration; Urban Runoff	NA

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
<i>Slocum Corners Creek</i>										
13-11	1.36	2.39	24*	N/A	41.4	61.5	Non - Fair	Siltation; No riparian ; Chlorides	Urban Runoff; Altered Hydrology	NA
<i>Unnamed Tributary to Aptakisic Creek</i>										
18-5	0.05	0.99	27*	N/A	21.7*	47	Non - Fair	Channelization; Siltation	Habitat Alteration;	NA
<i>Unnamed Tributary to Buffalo Creek</i>										
17-4	0.68	8.55	<u>12</u> *	N/A	27.0*	63	Non - Poor	Siltation; No riparian ; Chlorides	Urban Runoff; Altered Hydrology	NA
<i>Unnamed Tributary to Des Plaines River</i>										
13-17	0.13	0.86	<u>18</u> *	N/A	22.9*	62	Non - Poor	Siltation	Urban Runoff; Altered Hydrology	NA
<i>Unnamed Tributary to North Branch Mill Creek</i>										
10-6	0.04	0.99	<u>12</u> *	N/A	26.8*	61	Non - Poor	Siltation	Urban Runoff; Altered Hydrology	NA
<i>Unnamed Tributary to Greenleaf Creek</i>										
13-13	0.40	1.06	28*	N/A	20.3*	68.5	Non - Poor	Siltation	Urban Runoff; Altered Hydrology	NA

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
West Branch Indian Creek										
15-10	0.80	2.22	<u>13</u> *	N/A	25.9*	63	Non - Poor	Bank erosion; Siltation	Urban Runoff; Altered Hydrology	NA
West Branch Bull Creek										
14-4	2.54	5.10	<u>16</u> *	N/A	18.7*	32.5	Non - Poor	Dissolved Oxygen; Channelized; Siltation	Habitat Alteration; Urban Runoff	NA
14-3	1.60	7.05	26*	N/A	64.2	64	Partial	Siltation; No riparian;	Urban Runoff; Altered Hydrology	NA
West Fork Belvidere Rd. Tributary										
13-14	0.21	2.30	<u>15</u> *	N/A	28.3*	57.5	Non - Poor	Siltation; Channelization; Manganese	Habitat Alteration; Urban Runoff; Altered Hydrology	NA
13-8	0.15	3.75	31*	N/A	48.9	69.5	Partial (F)	Siltation; Chlorides	Urban Runoff; Altered Hydrology	NA
Werhane Lake Drain										
16-9	0.40	1.19	35*	N/A	41.4	59	Non - Fair	Siltation	Urban Runoff; Altered Hydrology	NA

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
Unnamed Tributary to Werhane Lake Drain										
16-10	0.10	0.22	22*	N/A	-	49.5	Non - Fair	Siltation	Urban Runoff; Altered Hydrology	NA
16-10B	0.80	0.22	-	-	43.4	-	NA			
Mill Creek										
11-6	17.20	4.51	21*	N/A	32.5*	40	Non - Fair	Siltation ; Chlorides; PAHs	Urban Runoff; Altered Hydrology	NA
11-5	13.80	10.4	<u>20</u> *	N/A	30.8*	49	Non - Fair	Siltation ; Chlorides	Urban Runoff; Altered Hydrology	NA
11-4	10.10	18.3	22*	N/A	36.6*	57	Non - Fair	Siltation ; Chlorides	Urban Runoff; Altered Hydrology	D.O., pH
11-3	7.20	21.4	<u>14</u> *	<u>4.6</u> *	48.3	63	Non - Poor	Siltation ; Bank erosion ; Chlorides	Urban Runoff; Altered Hydrology	D.O., pH
11-2	1.71	62.3	32*	9.3	25.8*	79	Non - Fair	Siltation ; Chlorides	Urban Runoff; Altered Hydrology	D.O., pH
11-1	0.70	63.8	31*	7.9 ^{ns}	50.7	71	Partial (F)	Siltation ; Chlorides	Urban Runoff; Altered Hydrology	D.O., pH

DRWW Site ID	River Mile	Drainage Area (mi. ²)	fIBI	MIwb ¹	mIBI	QHEI	Attainment Status ²	MBI Causes	MBI Sources	IEPA Causes
North Branch Mill Creek										
10-3	10.20	20.8	<u>14</u> *	7.3*	33.1*	52	Non - Poor	Siltation; Conductivity	Urban Runoff; Altered Hydrology	D.O., TP
10-2	8.10	29.4	<u>13</u> *	<u>3.8</u> *	31.6*	75.5	Non - Poor	Siltation; Conductivity	Urban Runoff; Altered Hydrology	NA
10-1	1.10	32.0	22*	<u>5.3</u> *	55.3	70	Partial (F)	Siltation; Conductivity	Urban Runoff; Altered Hydrology	As, Mn, TP, Siltation

¹ The Modified Index of Well-Being (MIwb; Gammon 1976; Ohio EPA 1987) does not have a biocriterion in IL – the default is the Ohio value for the E. Corn Belt Plains (ECBP) ecoregion wading (8.3) and boat sites (8.5) with a 0.5 unit allowable departure designated as ^{ns}; the MIwb is not calculated for headwater sites <20 mi.².

² - IEPA Aquatic Life Use Support Thresholds

AQLU Status	fIBI	mIBI
Full Support	≥41	≥41.8
Non-Support Fair	>20,<41	≥20.9,<41.8
Non-Support Poor	≤20	<20.9

³ Partial support is a non-IEPA designation to a site with the non-attaining assemblage below the full support level for the fIBI or mIBI.

⁴ NA – Status and causes were not assessed at this location by IEPA.

⁵ – Extrapolated from field conductivity measures.

**Major Causes Associated with Aquatic Life Impairments:
Upper Des Plaines 2016**

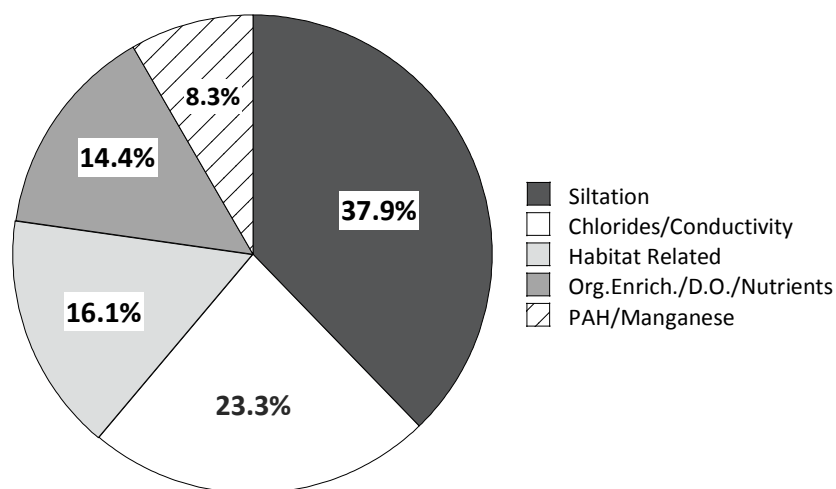


Figure 1. Major causes associated with aquatic life impairments in the Upper Des Plaines study area, 2016.

PAHs). Certain causes such as siltation (66 of 70 sites) and chlorides (41 of 70 sites) were pervasive throughout the study area while others were either localized or sporadic throughout the study area. Sources included urban runoff, habitat alterations, altered hydrology, and WWTP effluent. These constitute the principal causes and sources that would need to be addressed to resolve the aquatic life impairments listed in Table 1. Illinois EPA (2016a) listed a different set of causes at 20 of the 64

biological sites including arsenic, chlorides, low dissolved oxygen, pH, fecal coliform bacteria, iron, manganese, methoxychlor, mercury, phosphorous, polychlorinated biphenyls, and total suspended solids. Some of this is likely due to the different interpretation of effect threshold exceedances and that IEPA sampled less than one-third of the sites sampled in the 2016 Upper Des Plaines watershed bioassessment.

Synthesis of Results

Biological signatures of siltation related impacts, altered hydrology, and organic enrichment from multiples sources were evident throughout the 2016 study area. Organic enrichment related biological responses in the form of increases in tolerant species, reductions in numbers and biomass, and increased DELT anomalies on fish occurred downstream from WWTPs in Aptakisic Creek and Mill Creek with the former revealing a toxic response signature in the macroinvertebrate results. Sediment contamination was revealed with PAH compounds exceeding consensus based threshold and probable effect levels in the mainstem and several tributaries correlated with the degree of urbanization. Only a few D.O. exceedances were measured by daytime grab sampling and those were largely in the very sluggish and highly enriched upper Des Plaines River mainstem - continuous monitoring is needed to better reveal where such exceedances may be limiting to aquatic life. Continuous monitoring is also needed to reveal where nutrient enrichment is contributing to excessive diel D.O. fluctuations that rarely coincide with exceedances of the average and minimum D.O. criteria. The most prevalent stressor across all sites in the Upper Des Plaines River watershed is heavy siltation associated with habitat alterations and altered hydrology from urban and suburban runoff. Dissolved materials in the form of elevated chlorides and conductivity were prevalent in the most urbanized parts of the mainstem Upper Des Plaines River and tributary subwatersheds. A trend analysis revealed that chlorides are increasing at the rate of 1.7 to 3.6 mg/L on an annual

basis. Chlorides were the second most prevalent cause associated with the biological impairments.

Recreational Use Assessment

Levels of fecal bacteria in the form of *Escherichia coli* (*E. coli*) cfu/100 mL were used to assess the status of the General Use for recreational in and on the water. The IEPA criteria are expressed as counts of fecal coliform bacteria, which were not measured, so the U.S. EPA national criteria for *E. coli* were used instead. Fecal bacteria criteria are generally in terms of a geometric mean and a statistical threshold value (STV) which is the 90th percentile of the data distribution that is not be exceeded by more than 10 percent of the samples. Given the low sample size, the maximum values were used here as an approximation of the STV. The recommended geometric mean criteria value is 126 cfu/100 ml and the STV criteria value is 410 cfu/100 ml (U.S. EPA 2012). There were numerous exceedances of the U.S. EPA recommended criteria (Table 2). With one exception, the exceedances of both the geometric mean and maximum in the Des Plaines mainstem occurred downstream from the discharge of treated sewage effluent. An exceedance of the maximum occurred at RM 102.9 (site 13-4) which is upstream of all major WWTPs. Two tributaries with exceedances of the geometric mean and maximum included Hastings Creek and Aptakisic Creek and both were downstream of WWTP discharges. Exceedances of both the geometric mean and maximum occurred in other tributaries and with no apparent relationship to a specific source or sources, except generalized urban and agricultural runoff. Even so, these results will be valuable for more detailed investigation of possible sources of fecal contamination. The low frequency of sampling is less than what IEPA requires for an impaired waters listing based on recreational use impairment.

Table 2. *E. coli* values (cfu/100 ml) for samples collected in the Upper Des Plaines study area during May-October 2016. Yellow shaded values exceed the recommended U.S. EPA (2012) recreation use criteria.

DRWW Site ID	Basin Code	Stream Code	River Mile	N	Minimum (cfu/100 mL)	Geometric Mean (cfu/100 mL)	Maximum (cfu/100 mL)
Des Plaines River							
13-6	95	656	109.3	6	27.2	92.6	387
13-5	95	656	106.6	5	6.3	49.9	131
13-4	95	656	102.9	6	42.2	111.6	548
13-3	95	656	98.7	5	65.7	214.4	1050
13-2	95	656	96.82	6	1	106.1	816
13-1	95	656	94.2	6	88.4	147.1	219
16-6	95	656	87.1	6	81.6	126.3	326
16-5	95	656	83.6	6	55.4	139.6	435
16-4	95	656	80	6	64.4	145.8	228
16-3	95	656	76.7	6	65.1	138.3	411
16-2	95	656	75.4	6	54.6	121.1	308
16-1	95	656	71.7	6	2	49.9	387

DRWW Site ID	Basin Code	Stream Code	River Mile	N	Minimum (cfu/100 mL)	Geometric Mean (cfu/100 mL)	Maximum (cfu/100 mL)
Hastings Creek							
10-5	95	702	3.12	5	3.1	106.2	921
10-4	95	702	1.68	5	179	390.9	980
North Mill Creek							
10-3	95	996	10.2	5	1	115.3	816
10-2	95	996	8.1	6	98.5	374.2	1050
10-1	95	996	1.1	6	1	150	866
Mill Creek							
11-6	95	995	17.2	6	435	656.3	921
11-5	95	995	13.8	6	1	50.8	201
11-4	95	995	10.1	6	115	189.7	345
11-3	95	995	7.2	5	1	74.5	488
11-2	95	995	1.71	6	52.1	239.4	866
11-1	95	995	0.7	6	80.9	258.9	727
Newport Drainage Ditch							
12-1	95	708	0.7	6	1	90.4	517
Hastings Creek							
13-9	95	702	0.42	5	27.9	106.9	649
Bull's Brook							
13-7	95	704	0.25	6	1	16.9	980
Suburban Country Club Tributary							
13-10	95	710	2	6	1	130.7	816
Slocum Corners Creek							
13-11	95	711	1.36	5	162	655.7	1200
West Fork Belvidere Rd. Tributary							
13-8	95	720	0.15	6	21.6	86.7	326
Bull Creek							
14-2	95	051	1	6	86.5	216.2	345
14-1	95	051	0.5	6	201	410.4	921
Seavey Drainage Ditch							
15-3	95	390	3.66	5	196	346.3	649
Indian Creek							
15-6	95	706	9.83	5	1	101.8	770
15-5	95	706	5.4	6	1	105.3	579
15-2	95	706	2.41	6	131	296.1	579
15-1	95	706	0.17	6	59.8	299.9	980
Killdeer Creek							
15-7	95	707	4.6	6	93.3	156	219
15-4	95	707	0.01	6	88.4	368.7	886

DRWW Site ID	Basin Code	Stream Code	River Mile	N	Minimum (cfu/100 mL)	Geometric Mean (cfu/100 mL)	Maximum (cfu/100 mL)
<i>Buffalo Creek</i>							
17-3	95	703	7.7	5	1	84.7	687
17-2	95	703	6.1	5	30.9	73.4	167
17-1	95	703	0.75	4	1	66.3	816
<i>Unnamed Tributary to Buffalo Creek</i>							
17-4	95	713	0.68	6	1	15.2	276
<i>Aptakisic Creek</i>							
18-2	95	701	0.8	6	1	94.7	345
18-1	95	701	0.5	6	93.3	225.4	488